COMPONENTS:

- (1) Rubidium oxide; Rb₂0; [18008-11-4]
- (2) Phosphorus pentoxide; P₂0₅; [1314-56-3]
- (3) Water-d₂; D₂0; [7789-20-0]
- (4) Water; H₂O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Rashkovich, L.N.; Momtaz, R.Sh.

Zh. Neorg. Khim. 1978, 23, 1349-55.

VARIABLES:

PREPARED BY:

Temperature and composition.

J. Eysseltová

EXPERIMENTAL VALUES:

Composition of saturated solutions in the Rb₂0-P'₂0₅-H₂0 system.

t∕°c	Rb ₂ 0 mass%	P ₂ O ₅ mass%	solid phase	t/°c	Rb ₂ 0 mass%	P2 ⁰ 5 mass%	solid phase
25	43.2	22.2	Rb(H,D) ₂ PO ₄	50	42.9	23.2	Rb(H,D)2PO4
25	35.5	21.2	1,12 4	50	36.5	22.2	1, 2 4
25	32.3	20.3	11	50	34.5	22.4	11
25	31.0	20.1	11	50	33.5	22.3	H
25	28.8	19.9	11	50	32.0	22.3	!!
25	26.4	20.8	D	50	31.6	22.2	11
25	28.2	29.2	*11	50	29.9	22.5	11
25	28.9	32.6	11	50	29.6	23.2	11
25	28.8	32.9	11	50	30.5	30.2	II .
25	29.4	35.9	11	50	30.8	33.1	11
25	26.1	38.2	Rb(H,D) ₅ (PO ₄) ₂	50	31.1	33.4	***
			5 4 2	50	31.5	36.5	11
				50	31.3	36.5	11
				50	31.1	37.8	$Rb(H,D)_{5}(PO_{4})_{2}$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The mixtures were heated until nearly all the solid phase had disappeared. Then the temperature required was established and the mixtures were thermostated for at least 2 weeks. The composition of the liquid phase was determined by potentiometric titration with KOH after the samples had first been acidified with a known amount of H₃PO₄. The deuterium content was determined by a method described elsewhere (1).

SOURCE AND PURITY OF MATERIALS:

 ${\rm Rb_2CO_3}$ and ${\rm D_3PO_4}$ were used as received. The impurities in these substances was less than 0.05 mass%. The electrolytic conductivity of the heavy water was 6 x 10^{-6} S cm $^{-1}$. The extent of deuteration was 96% for ${\rm D_3PO_4}$, 99% for ${\rm D_2O}$, and 90-91% for the saturated solutions.

ESTIMATED ERROR:

The temperature was controlled to within \pm 0.01 K. The analyses had a precision of \pm 0.1 mass%.

REFERENCES:

 Volkova, E.N.; Podshivalov, J.S.; Rashkovich, L.N.; Strukov, B.A. Izv. AN SSSR, ser. fiz. 1975, 39, 288.

COMPONENTS:

- (1) Rubidium dihydrogenphosphate; RbH, PO4; [13774-16-8]
- (2) Rubiduym oxide; Rb₂0; [18088-11-4]
- (3) Phosphoric acid; H₃PO₄; [7664-38-2]
- (4) Water; H₂O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Rashkovich, L.N.; Momtaz, R.Sh.

Zh. Neorg. Khim. 1978, 23, 1349-55.

VARIABLES:

PREPARED BY:

Temperature and composition.

J. Eysseltová

EXPERIMENTAL VALUES:

The authors express their data for the ${\rm Rb}_2{\rm O-P}_2{\rm O}_5{\rm -H}_2{\rm O}$ system. The compiler has recalculated their data to convert it to the $RbH_2PO_4-H_3PO_4-H_2O$ system.

	compiler's recalculated values							authors' data	
solid	RbH ₂ PO ₄		H ₃ PO ₄		0	Rb ₂ O		Rb ₂ O P ₂ O ₅	
phase	mo1%	mass%	mo1%	mass%	mo1%	mass%	mass%	mass%	pН
				25°C.	temp. =				
^{RbH} 2 ^{PO} 4	7.16	51.1			1.36	9.19	19.9	35.4	6.6
211 4	5.37	47.0			0.56	5.00	18.3	29.1	5.8
11	5.04	46.0			0.43	4.02	17.9	27.6	5.6
11	4.76	44.7			0.39	3.78	17.4	26.7	5.2
tt.	4.72	44.7			0.35	3.38	17.4	26.3	5.2
11	4.43	44.2			0.11	1.15	17.2	23.8	4.7
**	5.80	47.8	1.60	7.08			23.8	24.6	2.6
11	6.05	48.4	1.83	7.87			24.6	24.9	2.5
ti	7.05	50.1	2.86	10.9			27.5	25.8	2.1
**	8.20	51.7	8.20	13.8			30.2	26.6	1.9
"	9.39	53.2	5.17	15.7			32.2	27.4	2.0
**	12.2	55.0	8.49	20.5			36.3	28.3	1.4

(continued next page)

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The mixtures were heated until almost all the solid phase had dissolved and then they were thermostated at the specified temperature for at least 2 weeks. The composition of the liquid phase was determined by potentiometric titration with KOH after being acidified with known amounts of ${\rm H_2PO}_{\perp}$. The solid phases were identified microscopically.

SOURCE AND PURITY OF MATERIALS:

The $\mathrm{Rb}_2\mathrm{CO}_3$ and $\mathrm{H}_3\mathrm{PO}_4$ were used as received. The amount of impurities did not exceed 0.05 mass%. The electrolytic conductivity of the water was 5 x 10^{-5} S cm⁻¹.

ESTIMATED ERROR:

The temperature was controlled to within ± 0.1 K. The precision of the analyses was ± 0.1 mass%.

REFERENCES:

COMPONENTS:

- (1) Rubidium dihydrogenphosphate; RbH₂PO₄; [13774-16-8]
- (2) Rubidium oxide; Rb₂0; [18088-11-4]
- (3) Phosphoric acid; H₃PO₄; [7664-38-2]
- (4) Water; H₂O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Rashkovich, L.N.; Momtaz, R.Sh. Zh. Neorg. Khim. 1978, 23, 1349-55.

EXPERIMENTAL VALUES cont'd:

author	s' data	compil	er's reca	alculated	values			
Rb ₂ O	P2O5	Rb ₂ O		H ₃ PO ₄		RbH ₂ PO ₄		solid
mass%	mass%	mass%	mo1%	mass%	mo1%	, mass%	mo1%	phase
			temp.	= 50°C.				
36.2	21.8	7.49	1.10			56.0	8.42	RbH ₁₁ 2 ^{PO} 4
33.5	21.5	5.18	0.70			55.3	7.66	,,2 4
31.8	21.1	4.01	0.51			54.2	7.12	11
31.3	21.3	3.25	0.41			54.7	7.14	11
30.1	21.2	2.18	0.27			54.5	6.89	Ð
28.6	20.8	1.21	0.14			53.5	6.46	Ħ
28.3	21.2	0.38	0.05			54.5	6.61	**
28.5	23.2			2.17	0.52	55.3	7.14	er .
29.5	28.4			8.29	2.46	57.3	9.12	11
30.3	33.6			14.6	5.63	58.8	12.2	tt.
30.7	36.0			17.5	7.82	59.6	14.3	**
31.3	39.6			21.9	12.8	60.8	19.2	11
31.4	39.5			21.6	12.7	61.0	19.2	H
30.9	41.7			25.2	17.3	60.0	22.2	RbH ₅ (PO ₄) ₂

The authors linearized their data in the form:

$$w_{Rb_2O} = a + b w_{P_2O_5}$$

In the region where P/Rb >1 the constants have the following values:

for t =
$$25^{\circ}$$
C: a = 17.5 ± 0.4 mass% and b = $0.30 \pm 0.01 \pm \sigma = 0.1$

for t =
$$50^{\circ}$$
C: a = 24.6 ± 0.1 mass% and b = 0.172 ± 0.004 $\pm \sigma = 0.06$

In the region where Rb₂O is in excess

for t =
$$25^{\circ}$$
C: a = -40 ± 5 mass% and b = $3.8 \pm 0.3 \pm \sigma = 0.6$

for t = 50° C: a = -124 ± 23 mass% and b = 7.3 ± 1.1 $\pm \sigma = 0.8$